REMARKS

Reconsideration of the above-identified application in view of this Response is respectfully requested. This Response is in response to the Office Action dated June 30, 2004. By said Office Action, claims 12 - 14 were rejected under 35 U.S.C. 102(b) as being anticipated by Kurtz et al. (U.S. Patent No. 5,569,626). Claims 15 - 17 were acknowledged as allowable subject matter over the prior art of record.

By this Response, claims 12, 13, and 15 - 17 remain as originally filed. Claims 1 – 11 and 14 have been canceled.

Briefly, the present invention relates to producing or inducing piezooptic behavior in a porous crystalline material element, and a piezooptic device for implementing thereof. More specifically, the invention includes a method of straining a porous crystalline material element by subjecting the porous crystalline material element to light, and a method of relaxing the strained porous crystalline material element which is subjected to light, by preventing the light from impinging on the strained porous crystalline material element.

35 U.S.C. 102(b) Rejections

The Examiner rejected claims 12 - 14 under 35 U.S.C. 102(b) as being anticipated by Kurtz et al. (U.S. Patent No. 5,569,626), hereinafter, referred to as Kurtz. As described hereinbelow, the Examiner's rejection is respectfully traversed regarding claims 12 and 13, whereas claim 14 has been canceled.

The Applicant respectfully points out to the Examiner that the method for implementing the piezooptical device, and therefore, for producing piezooptical behavior, disclosed in Kurtz are clearly and undisputedly fundamentally different to the method for

implementing the piezooptical device, and therefore, for producing piezooptical behavior, disclosed and recited in claims 12 and 13 of the present application.

The title of the Kurtz disclosure is "Piezo-optical Pressure Sensitive Switch And Methods For Fabricating The Same". In Kurtz, throughout the entire Background section there is description, including citation of several prior art references, focusing on the known phenomenon, as written therein in column 1, lines 13 - 18, that ". . . the **application of a pressure or stress can effect** not only the energy gap of semiconductors but also the population of the various equi energy valleys, thereby altering **the quantity of energetic carriers**. The **sensitivity to stress exhibited by semiconductor materials** has enabled the fabrication of a wide variety of devices . . . ". Throughout the remainder of the Background section there is exclusively described, as written in column 1, lines 43 - 45, ". . . the phenomenon of quantum confinement in microcrystalline silicon and its effect on piezoresistance . . . ". Further therein, in column 1, lines 54 - 61, it is written ". . . conductivity decreases of up to 100 percent were observed in microcrystalline silicon films **under compression**, suggesting that such films might be utilized for highly sensitive strain gauge applications. Foresi et al. attributed the decreases in conductivity to quantum confinement . . . in the small silicon crystallites and to the **change of** the ground state **energy** in the quantum wells **with strain**".

In the Abstract of Kurtz it is written "The devices monitor **pressure or force applied thereto** by detecting a corresponding change in the amount of light absorbed by a porous layer of semiconductive material such as silicon". Therein, it is further written "When unstressed, the porous layer absorbs monochromatic light of a predetermined wavelength. **When the porous layer is (externally) stressed**, a metallized epitaxial layer formed thereon reflects the light back through the transparent layer where it can be detected by a light detection system".

In the Summary section of Kurtz, in column 2, lines 26 - 30, it is written "The device monitors **pressure or force applied thereto** by detecting a corresponding change in the frequency of light absorbed by **the porous layer**. **A pressure or stress signal is thus convened (probably, incorrect spelling of 'converted') into an optical one**". Further therein, in column 2, lines 38 - 41, it is written "When unstressed, the porous layer absorbs monochromatic light . . . ". When **the porous layer is stressed, the energy gap is changed** and light . . . may no longer be absorbed".

In the Description section of Kurtz, with reference to Fig. 1A, in column 3, lines 24 - 31, it is written "The porous layer 18 may be comprised of silicon, silicon carbide, or any other **porous semiconductive material which undergoes a proportional change in light absorption in response to the application of a pressure, stress, or other force** thereto". Further therein, in column 3, lines 33 - 35, it is written "**Pressure or stress forces applied** to cap layer 20 are transmitted through the cap layer and thus **into porous layer** 18". Further therein, in column 4, lines 16 - 19, it is written "Light leaving cable section 29b is incident on the surface 26 of porous layer 18 and is reflected by the reflective layer formed on the surface of cap layer 20". Further therein, in column 4, lines 26 - 28, it is written "**The degree to which the light is absorbed is utilized to determine the amount of stress or force applied to the porous layer**". Further therein, in column 4, lines 35 - 37, it is written ". . . the device can be switched from a transmitting state to a non-transmitting state **by applying stress** to the non-porous cap layer 20". Further therein, in column 4, lines 39 - 42, it is written "As such, **when a stress is applied**, the energy gap increases until light is no longer absorbed by porous layer 18".

It is clearly and unambiguously understood from the Kurtz disclosure, in general, and from the above quoted highlights of the Kurtz disclosure, in particular, that **the Kurtz disclosure is exclusively about the effect that application of an 'external' pressure or**

stress force has on the optical (reflective - absorptive) behavior of a porous semiconductive material such as porous crystalline silicon, and a piezooptical device for implementing thereof, and <u>has absolutely nothing to do with</u> producing or inducing a strain in a porous crystalline material element by illuminating the porous crystalline material element, as recited in claims 12 and 13, and fully supported by the text and figures, of the present application.

Regarding Examiner's reasons and cited sections of text from the Kurtz disclosure which were used for rejecting claim 12, the Applicant respectfully points out to the Examiner that, in fact, they clearly and unambiguously describe a method "to determine the amount of stress or force applied to the porous layer" by measuring "The degree to which the light is absorbed", as written in Kurtz, column 4, lines 25 - 27. As clearly written in column 3, lines 34 - 36, "Pressure or stress forces (externally) applied to the cap layer 20 are transmitted through the cap layer and thus into porous layer 18". In column 4, lines 16 - 19, it is clearly written "Light leaving cable section 29b is incident on the surface 26 of porous layer 18 and is reflected by the reflective layer formed on the surface of cap layer 20", and further written in lines 21 - 25, ". . . whereupon the light is received by a detection means 34 which is adapted to determine whether the light has been reflected or absorbed by the sensing element as well as the degree to which it has been absorbed".

The Applicant strongly contends that this description in the Kurtz disclosure clearly does not anticipate "A method of straining a porous crystalline material element, the method comprising the step of subjecting the porous crystalline material element to light", as recited in claim 12 of the present application. The only common feature shared by both the method described in Kurtz and that recited in claim 12 of the present invention is the action of illuminating a porous material, such as porous crystalline silicon. In the method described in Kurtz, the stress or force which is externally applied to the porous layer is

specifically provided for the sole function of changing the optical (reflective - absorptive) behavior of the porous material; a stress, force, or strain, is clearly, unambiguously, not produced or induced in the porous material by the illumination.

Regarding Examiner's reasons and cited sections of text from the Kurtz disclosure which were used for rejecting claim 13, the Applicant respectfully points out to the Examiner that the method disclosed by Kurtz does not inherently include relaxation of the stressed porous material as a result of turning off the light source, since in the first place, activation of the light source is not at all related to the cause or maintenance of the stress in the porous material. Moreover, the description in Kurtz, column 4, lines 26 - 28, wherein it is written "The degree to which the light is absorbed is utilized to determine the amount of stress or force applied to the porous layer", along with that written in column 4, lines 16 - 19, describing illumination of the surface 26 of porous layer 18, cannot be used for reasonably assuming, or anticipating, "A method of relaxing a strained porous crystalline material element which is subjected to light, the method comprising the step of preventing the light from impinging on the strained porous crystalline material element", as recited in claim 13 of the present application.

As a matter of fact, by carefully reading the method described in Kurtz, one clearly and unambiguously understands that the porous material is subjected to the external stress or force **prior to** activation of the light source, whereupon one arrives at the sole conclusion that the stressed porous material definitely remains in the stressed state (as long as the stress or force continues to be externally applied) in the event that the light source is turned off, since the light source is solely used for "determining" or measuring the change in the optical behavior of the (externally) stressed porous material and clearly is not used for causing, or inducing, the stress in the porous material.

The Applicant strongly contends that there is no explicit or implicit description, illustration, suggestion, or hint, throughout the entire Kurtz disclosure, reading upon the recitations of claims 12 and 13 of the present application, and therefore, that the recitations of claims 12 and 13 of the present application are clearly not anticipated by, or obviously derived from, the disclosure of Kurtz. Accordingly, the Applicant firmly believes that the recitations of originally filed claims 12 and 13 are in allowable condition and such action is respectfully requested.

Regarding Examiner's rejection of claim 14 based on grounds of 35 U.S.C. 102(b), the Applicant has selected to cancel claim 14.

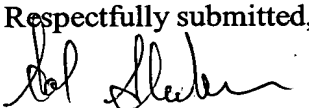
In view of the discussion above in the context of the 35 U.S.C. 102(b) rejections, the Applicant submits that original claims 12 and 13 are allowable in their present form, and such action is respectfully requested.

Claims 15 - 17 were acknowledged as allowable subject matter over the prior art of record.

Brody (U.S. Patent No. 4,524,294), cited by the Examiner in PTO-892 as being pertinent to the Applicant's disclosure has been carefully reviewed, but is deemed not to render the Applicant's invention unpatentable, as was properly determined by the Examiner in said Office Action.

In view of the foregoing, it is submitted that claims 12, 13, and 15 - 17, now pending in the application are allowable over the cited prior art. An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,



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